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COMPARATIVE TWIN STUDY ON THE GENETIC ASPECTS OF MALE HOMOSEXUALITY*

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When the objectives of a combined twin and sibship study of overt homosexuality in the adult male were formulated by us in 1947, we were prepared for a convergence of codified sensitivities to both deviant forms of sex behavior and genetically controlled imperfections in the existence of modern man. Nevertheless, we were confident that the experience gained in previous population surveys of a similar magnitude would prove to be useful. We soon discovered, however, that we had been rather inexpert, or overly optimistic, or possibly both.

We know now that it is quite inadvisable either to underrate the particular methodologic difficulties, which are inherent in a search for verifiable data concerning the cultural backgrounds and sex experiences of a series of *distrusting* research subjects, or to overrate the durability of a professed spirit of co-operation on the part of social agencies which seem eager to act as secret guardians of an intrinsically maladjusted group of our society. In fact, we are ready to concede at this point that an investigation of the sexual habits and self-protective devices of an ostracized class of people and their family relations is not a promising field of exploration for research workers who are in any way concerned about their conventional peace of mind. Psychiatrically it has been interesting to confirm, however, that the problems and attitudes of a sexually aberrant group look less wholesome in the twilight of gloomy hiding places than they do from the perspective of an ornamental desk or from a comfortable therapeutic couch.

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Procedurally it is especially impedient in a twin family study of this kind that the road from the point of procuring the name and recorded history of an apparently homosexual twin subject to the establishment of a formal acquaintance with the given person or his relatives is an incredibly long, rugged, and sometimes perilous one. The subjects are astute in disguising their identities, shifting whereabouts and family connections. They usually live far from their families, and they are rarely able or willing to discuss more than their personal histories. In addition, most of them are unavailable for laboratory tests, since they insist that interviews be arranged in accordance with their habits of precaution, that is, at neutral meeting places.

In view of these difficulties it was evident from the beginning that the *twin study method* would be technically much too cumbersome a procedure to warrant its application for the sole purpose of demonstrating the basic genetic origin of both structural and functional aspects of every type of sex behavior. Regardless of whether the term "homosexuality" is applied to the formation of all, or only to the practice of overt, sexual relations between individuals of the same sex (17), it has always been clear that neither the quality nor the object of a person's sexual striving can possibly undergo a habitual fixation without the pre-existence of the organic components of sexuality, which may sometimes fail to be integrated into a mature form of sex behavior.

This statement does not mean, of course, that sex-controlling genes are suspected genetically of being able to determine the final choice of a sex partner. For similar reasons, no gene is assumed to produce a special preference for saccharine, even if it may be held responsible for a certain type of biochemical dysfunction resulting in the symptomatology of diabetes mellitus. It is rather unnecessary, therefore, to overstress the nonexistence of "inheritable qualities in the structurization of the sex potentiality that would direct a person either away from a member of the same sex or toward the opposite sex" (14).

Although gonadal hormones are known to be essential for the activation and gradual differentiation of maturational processes, they are only the tools, with which the genetic constitution of an organism directs its sexual development from a morphologically neutral embryonic stage to the functional responsiveness of adult sex adjustment. Originally, all the developmental potentialities of one or the other sex are determined by the chromosomal make-up of the gametes. The starting point for any differentiation of maturational processes depends on whether a sperm bearing a paternal grandmother's X-chromosome or a sperm bearing the grandfather's Y-chromosome unites with the ovum. Following fertilization, the process of mitosis takes care of pro-

viding every cell of the developing embryo and ultimate adult with the original XX- or XY-constitution of the fertilized ovum (27).

As a rule, the balance established between the sex-controlling effect of one or two X-chromosomes and that of the other chromosomes operates with a sufficient margin of safety to preclude intersexual development, that is, imperfect determination of one or the other sex due to a disturbed balance of female and male genetic tendencies. However, if a breakdown in the usual process of clearly alternative differentiation between the sexes occurs, the maturational effect of one or the other of the opposing sex genes may be weakened precariously. Such an organic disarrangement is apt to lead to a variety of intersexual deviations, interfering with full integration of the ordinary patterns of sexual maturation.

According to psychodynamic theories of sociologic or psychoanalytic orientation, a possible causal relationship between an organically disarranged sex constitution and a tendency to overt homosexuality in the adult can be safely disregarded. A certain degree of sexual feeling toward one's own sex is assumed to remain a residual trait in every person, as the result of what is originally considered to be a complete freedom of choice. Subsequent preference for predominantly homosexual patterns is believed to be a product of individual learning and experience (4, 12, 21, 22). Final adherence to homosexual outlets in men is ascribed either to the conditioning compulsiveness of social ostracism with respect to common "physiologic" deviations from the moral code of our society (14, 17) or to traumatized regression and fixation to immature levels of sexuality (1, 3, 7). In line with the latter concept, inversive anxiety may be aroused by competetiveness in the oedipal situation and is apt to result in one of two possible patterns of response, namely, in seductive submission to the parental rival or in erotized identification with the mother.

In addition, the specific psychodynamic significance of certain personality deviations has been emphasized by a group of psychiatrically experienced investigators, especially by Bychowski, Hoch, and Rado (14). The evidence of such special psychopathologic phenomena in homosexual men is said to include general personality distortion with a prevalence of schizoid or "schizo-sexual" disorganization as well as the "obsessive" feature of insistence on pregenital or paragenital gratification patterns. Surprisingly, Kinsey (17) generally disfavors any explanation of male homosexuality which would imply the possibility of "pan-sexuality" in the sense of polymorphic-perverse stages in psychosexual development. In relation to this point, the element of surprise stems from the fact that Kinsey does not seem to be entirely opposed

to a consideration of genetic factors as a potential source of variations in sexual responsiveness, at least indirectly through inheritance of certain physical characteristics or behavioral qualities "which may help determine human personality."

Otherwise, only a few contemporary investigators (2, 6, 8, 9, 13) have shown an inclination to give cautious support to a *genetic theory* of male homosexuality as originally suggested by Krafft-Ebing (19). In the opinion of Henderson and Gillespie (11), for instance, the probability of a primary constitutional basis in some apparently conditioned types of male homosexuality is indicated not only by the frequency of physical characteristics which, like the horizontal pubic hair pattern, belong to the female sex, but also by the unusual number of homosexual men displaying "special artistic ability." *Familial* occurrence, notably in brothers, is said by Hirschfeld (13) to have been observed in 35 per cent of homosexual males, and concordance as to overt homosexuality has been reported by three investigators (13, 23, 26) in a total of 14 male twin pairs classified as monozygotic. Goldschmidt's theory of an intersexual origin of certain forms of human homosexuality is known to have been formulated on the basis of experiments conducted with gypsy moths (10). The main support for the application of this theory in man has come from the observation, made by Lang (20) as well as by Jensch (15), that the sex ratio among the siblings of male homosexuals seems to deviate sharply from ordinary expectation.

However, the *statistical* adequacy of these studies has been criticized by both Koller (18) and Darke (5). Equal validity is probably attached to Kinsey's statement that an increase in the homosexuality rates for the blood relatives of homosexuals has never been substantiated by means of statistically satisfactory investigations. It is evident, too, that if some homosexual men are assumed to be genetically female although phenotypically male intersexes without a Y-chromosome, their children should all be female. It would be preferable, therefore, to ascertain a significant deviation of the expected sex ratio in relation to the *offspring* rather than the siblings of homosexual males. In fact, Slater (25) is correct in stressing that the most conclusive test of the intersexuality theory would be procured by a *cytologic* examination of chromosomal biopsy material, which should show the lack of a Y-chromosome in intersexes with a known homosexual history. In the absence of such cytologic data, it is fair to admit that the question of the possible significance of genetic mechanisms in the development of overt homosexuality may still be regarded as entirely unsettled.

Taking notice of this generally unsatisfactory state of information

about the genetic aspects of adult homosexual behavior, explained at least in part by the previously described methodologic difficulties, our investigative plan aimed at a simultaneous and concentric attack from several directions. The frontal approach was based on the collection of an unselected and statistically representative sample of predominantly or exclusively homosexual *twin index cases* over age 20 or, preferably, over age 30. The search for potential index cases was organized not only with the aid of psychiatric, correctional, and charitable agencies, but also through direct contacts with the clandestine homosexual world. In addition, our procedure was arranged in such a manner as to provide verified clinical, social, and, whenever possible, cytologic data for graduated sex ratings of the index cases as well as their co-twins, brothers, and fathers, and for an adequately controlled determination of the sex ratio among the siblings and children of the index cases. However, some of these goals remained beyond reach within the given limits of time and organizational range, since scientific objectives and criteria in investigations of sexual deviations are much easier to devise than to attain in actual practice.

For instance, sex classifications can be made only of those children who have been born to homosexual subjects, but the actual size of this birth rate will be found to be inversely related to the rigidity of the criteria applied in the collection of homosexual index cases. If the present report is limited to a consecutive series of plainly homosexual twin index cases with fully recorded sex and family histories, this series provides verified evidence only of a total of 11 marriages contracted by an adult sample of 85 men with a homosexuality rating of group 3 or higher (Kinsey's scale). Most of these marriages lasted no longer than a few months, and only three of them were fertile, resulting in a total fertility quota of five children, three boys and two girls. Unfortunately, in no instance has it been possible to confirm the paternity of the legal fathers beyond reasonable doubt.

The data on the sex histories of the parents and siblings of the index cases are still insufficient and have not been included in this preliminary analysis. It may be mentioned, however, that of the 85 *fathers* only one is known at present to have had a history of overt homosexual behavior, in addition to several convictions for pedophilic acts.

The sex distribution of the 187 *siblings* of the index cases is recorded in Table I and has been arranged in such a manner that the sex ratios observed can be compared with the results of the surveys of both Lang (20) and Darke (5). In our sample, notable deviations from the expected ratio (106 males: 100 females) appear only in the sibships of those index cases, who are over age 25 (130.8) or not exclusively

homosexual (169.6). According to Kinsey's scheme (17), individuals in groups 3 and 4 stand midway on the heterosexual-homosexual scale or still maintain a fair amount of heterosexual activity. Evidently, if it can be confirmed by larger samples that the sharpest deviation from the expected sex ratio occurs in the sibships of homosexual men showing an indiscriminately promiscuous or polymorphic type of sex behavior, the biologic meaning of this finding would be of definite significance.

TABLE I.—SEX RATIO IN THE SIBSHIPS OF MALE HOMOSEXUALS

	HOMOSEXUAL MALES		SIBLINGS OF INDEX CASES				
	Age and Sex Rating	*Number of Index Cases*	*Brothers*	*Sisters*	*Sex Ratio* (to 100 females)*	*Probability* t	χ^2
Lang's Study	Under 26	516	778	687	113.2	1.23	1.51
	Over 25	499	956	745	128.3	3.92**	15.07**
	Total	1,015	1,734	1,432	121.1	3.67**	13.54**
Darke's Study	Under 26	44	82	67	122.4	.88	.74
	Over 25	56	96	101	95.0	.80	.62
	Total	100	178	168	106.0	.04	.00
Present Study	Under 26	17	19	18	105.6	.01	.00
	Over 25	68	85	65	130.8	1.26	1.59
	Groups 5 and 6	60	65	60	108.3	.11	.02
	Groups 3 and 4	25	39	23	169.6	1.80	3.25
	Total	85	104	83	125.3	1.14	1.27

*Expected sex ratio: 106 males: 100 females
**Significant

The total sibship sex ratio in our sample* is 125:100, approximating the one observed by Lang (121:100). However, contrary to Lang's figures, which are statistically significant at the .01 level for the older and the total groups of his study, the deviations in our proportionally smaller sample of "twin" index cases fail to reach the level of statistical significance with respect to both t and chi-square (x^2) values.

If the degree of significance in the present sample is computed for the subgroup with the largest value of t, that is, for the sibships of groups 3 and 4, t equals 1.80.

*It is a pleasure to acknowledge not only the helpful co-operation extended by many official agencies, especially the New York State Departments of Correction and Mental Hygiene, the New York State Division of Parole, the Probation Division of the New York City Magistrates' Court and the New York City Department of Correction, but also the valuable assistance rendered by members of our departmental research staff in the difficult investigative tasks of the survey (G. A. Colom, J. J. Danek, A. Falek, M. Gelfarb, K. Planansky, W. H. Shaw, J. A. Tieman, W. Wolfson) as well as in the statistical analysis of the collected data (G. Freedman).

$$\text{Where } t = \frac{P - p}{\sigma p},$$

$$P = \frac{\text{Observed number of male siblings}}{\text{total number of siblings } (N)},$$

$$p = \frac{106}{206} = .515, \qquad q = 1 - .515 = .485,$$

$$\sigma p = \sqrt{\frac{pq}{N}} = \sqrt{\frac{(.515)(.485)}{N}}$$

In this instance, therefore, t would have to be 2.07 at the .05 level of confidence and 2.81 at the .01 level in order to be statistically significant. The corresponding x^2 values for the total sample would have to be 3.84 at the .05 level, and 6.63 at the .01 level.

$$\text{Where } X_1 = \text{Number of male siblings},$$

$$m_1 = (\text{Total number of siblings}) \quad (.515),$$

$$X_2 = \text{Number of female siblings},$$

$$m_2 = (\text{Total number of siblings}) \quad (.485),$$

$$\chi^2 = \frac{(X_1 - m_1)^2}{m_1} + \frac{(X_2 - m_2)^2}{m_2}$$

It may be noted that the t and x^2 values show either the same lack of significance or an equally insufficient degree of significance in the present study. It will be necessary, therefore, to re-examine the question as to the presence or absence of consistent deviations in the sex ratio of homosexual index sibships on the basis of our numerically larger sample of single-born index cases.

More explicit are the comparative data in Table II, pertaining to the sex classifications of the *twin index pairs* themselves. Of 45 homosexual twin subjects in the *dizygotic* group, a total of 26 index cases had a twin brother who survived beyond the age of 18 years and was available for a complete investigation of his sex history. In this group, over one half (57.7 per cent) of the co-twins of distinctly homosexual subjects revealed no evidence of overt homosexual experiences after the onset of adolescence. According to whether the *dizygotic concordance rates* for homosexual behavior are related only to homosexuality ratings 5-6 or to the total range 1-6, they amount to 11.5 per cent or to 42.3 per cent, respectively, and are slightly higher than Kinsey's rates of 10 per cent and 37 per cent for the total male population,

although the percentages obtained in the present study may be acceptable only as minimum figures.

TABLE II.—GRADATIONS OF OVERT HOMOSEXUALITY (KINSEY'S RATING SCALE) IN THE CO-TWINS OF 85 MALE HOMOSEXUALS

TWIN INDEX CASES				ONE-EGG CO-TWINS						TWO-EGG CO-TWINS					
Sex Classification	*Age*	*Zygocity One-Egg*	*Two-Egg*	*6*	*5*	*4*	*3*	*2,1,0*	*Unclassified*	*6,5*	*4,3*	*2*	*1*	*0*	*Unclassified**
6	18–25	2	2	2	–	–	–	–	–	–	1	1	–	–	–
	26–35	10	8	8	1	–	–	–	1	–	–	–	2	1	5
	Over 35	8	9	6	2	–	–	–	–	–	–	–	3	4	2
5	18–25	3	3	–	1	–	1	–	1	–	–	–	–	2	1
	26–35	2	3	1	–	–	1	–	–	–	–	–	–	1	2
	Over 35	5	5	2	2	1	–	–	–	–	–	–	1	2	2
4	18–25	–	3	–	–	–	–	–	–	1	–	–	–	–	2
	26–35	2	3	–	–	2	–	–	–	–	1	–	–	1	1
	Over 35	3	3	–	1	–	2	–	–	–	–	–	–	1	2
3	18–25	2	2	–	1	–	–	–	1	–	–	–	–	1	1
	26–35	1	1	–	1	–	–	–	–	–	–	–	1	–	–
	Over 35	2	3	–	–	2	–	–	–	–	–	–	–	2	1
Total	Number	40	45	19	9	5	4	0	3	1	2	1	7	15	19

*Including 14 females and 5 unclassified males (deceased or otherwise unavailable).

On the basis of Kinsey's observations, 37 per cent of all males admit to at least some overt homosexual experience between adolescence and old age, while 10 per cent may be expected to be more or less exclusively homosexual (groups 5 and 6) for at least three years between the ages of 16 and 55. It may be borne in mind, however, that Kinsey's data on overt homosexuality apply to men distinguished by their willingness to co-operate with an investigation of ordinary *sex* behavior, and that the results of the present study pertain to the twin partners of index cases with a known history of homosexual experiences, that is, to men who had merely been requested to co-operate with the investigative aims of a *twin* study. It seems reasonable to conclude, therefore, that the tendency to overt homosexuality in adulthood is *moderately increased* in men who are the brothers (dizygotic twin partners) of predominantly or exclusively homosexual index cases.

A completely different situation is encountered in that group of 40 index pairs classified as *monozygotic*. This series does not include a single co-twin of an overtly homosexual person standing at least midway on the homosexuality scale, who is classifiable either as entirely heterosexual or as homosexual below group 3. The majority of one-egg pairs not only are fully *concordant* as to the overt practice and quantitative rating of their aberrant sex pattern, but they even tend to be

very similar in both the part taken in their individual sex activities and the visible extent of feminized appearance and behavior displayed by some of them.

It also seems significant that most of these index pairs assert to have developed their sexual tendencies *independently* and often *far apart* from each other, and that all of them deny categorically any history of mutuality in overt sex relations. The ostensible aversion to such an incestuous relationship is expressed even by those twin subjects who admit pre-adolescent sex play with a sister. In fact, the sexual taboo between homosexual twin brothers is generally carried so far that they disclaim not only the possibility of having had the same sex partner, but also that of being familiar with any intimate details of the co-twin's sex life. Apparently, the habitual secretiveness of homosexual men is maintained even by twin brothers who live together and have formed an entity in many other respects.

Psychiatrically it is of interest to note that apart from the striking similarity in sexual patterns, six of the index cases classified as monozygotic and concordant as to overt homosexuality have also been concordant with respect to schizophrenic episodes either before or after the manifestation of their homosexual tendencies. This group includes a pair of World War II veterans who, in addition to their histories of concordance as to homosexuality and schizophrenia, ended their lives by suicide in different ways (drowning and gas) and at different times (at the ages of 25 and 29, respectively) and thus became the first set of twins in whom this unusual occurrence has been authentically observed in modern times (16).

Because of the general significance of this monozygotic pair of schizophrenic twin brothers concordant as to homosexuality and death by self-destruction, it may be mentioned that the U. twins were of English-German descent, from a thrifty middleclass family, and the only sons of their parents (they had an older sister). Their early lives were uneventful, except for the fact that one of them (the second with respect to delivery and suicide) required plastic surgery on account of a disfiguring facial birth injury (left lower jaw) which seemed to have been responsible for a certain retardation in physical and mental development. In 1942, the twins entered different branches of the Armed Services from different universities, in spite of their histories of overt homosexual behavior and although the disfigured twin had been a conscientious objector. Within less than a year, they developed similar schizophrenic symptoms in different theaters of war, but at practically the same time. Following shock treatment in different hospitals, they were unable to readjust themselves to civilian life, ap-

parently because they were equally defective in their personalities and equally unmanageable in their tendencies to periodic vagabondism. The suicides were committed before and after the death of the mother

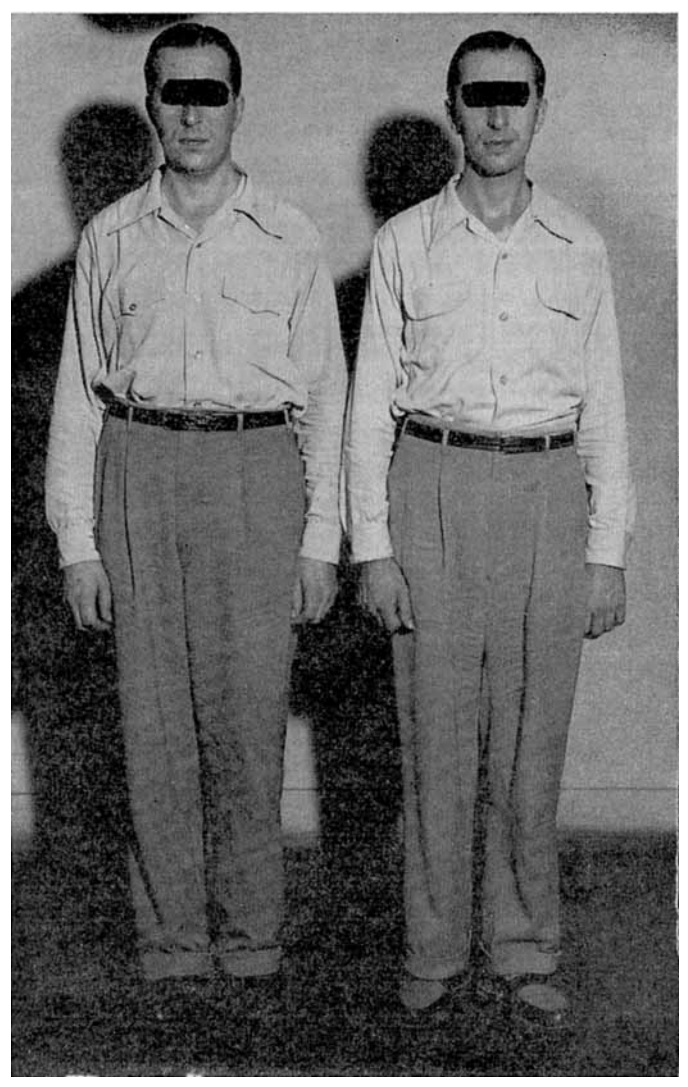


FIG. 1.—The J. twins at age 39.

(one at home, the other away from home) and were ascribed to fear of readmission to a mental hospital. In this tragic manner, the U. twins served to confirm our recently expressed opinion that "the suicides of two twin partners are apt to occur, but will only be observed by

chance (not directly related to one another even under similar conditions of unfavorable family background, social frustration, or emotional maladjustment) and, therefore, will be extremely rare" (16). The photographs of the pair are withheld upon the request of the twins' father.

Of the remaining subjects in the group of monozygotic twins concordant as to homosexuality, at least 22 index cases are classifiable as definitely schizoid, severely unstable with obsessive-compulsive features, or excessively alcoholic. Evidence of transvestitism has been observed in 7 cases of the total sample. Altogether, only 10 twin subjects of the monozygotic series and 18 subjects of the entire sample have been diagnosed as sufficiently adjusted, both emotionally and socially.



FIG. 2.—The O. twins at age 35.

The photographs of three concordant one-egg pairs are shown in Figs. 1-3, to illustrate the different types of homosexual behavior in this series. The J. twins (Fig. 1), who traveled as stewards all over the world, were sturdy and masculine in both their appearance and sex activities. The O. twins (Fig. 2) were heavy drinking night club entertainers, who specialized as female impersonators and belonged to the entirely passive type of homosexual. The K. twins (Fig. 3) earned their living as models and entertainers until their careers were ended by excessive alcoholism. In this pair, one twin introduced the

other to some of his homosexual friends of either variety. Further clinical or photographic data cannot be revealed, since most of the twin index cases of this survey are still subject to the laws of the State of New York.



FIG. 3.—The K. twins at age 22.

In an attempt to fit the *palpable results* of this study into a sufficiently broad and genetically sound concept of male homosexuality, it seems advisable to view overt homosexual behavior in the adult male as an *alternative minus variant* in the integrative process of psychosexual maturation rather than as a pathognomonically determinative expression of a codifiable entity of behavioral immaturity. Apparently, the interactions between the biologic components of sexual maturation and the adjustive phenomena of personality development form such a central and inseparable interrelationship that fractional deviations in the psychosomatic integration of the sex function from its pregenital elements to genital maturity may dislocate the axis, around which the organization of the personality takes place.

On the whole, the adaptational equilibrium between the potentialities of organic sex differentiation and the consequent patterns of psychosexual behavior seems to be so labile that the attainment of a maturational balance may be disarranged at different developmental stages and by a variety of disturbing mechanisms. The range of such a *multiple causation* of inversive tendencies apparently extends from an unbalanced effect of opposing sex genes to the equivalent of compulsive rigidity in a schizoid personality structure. From a genetic

standpoint, this range would be comparable to the extent of developmental possibilities in relation to left-handedness which, as an alternative variant in the integration of handedness, is in a predominantly right-handed human world what adult homosexuality is in the sexually reproductive human species. As to left-handedness, however, few investigators claim that a genically controlled basis or a certain unilateral use of the function of the left hand is precluded by a conditioned dexterity of the right hand, while analogous assumptions with respect to homosexual behavior are bitterly contended.

The disintegrative impact of those factors, which may lead to a psychosexual incapacity rather than to an optional dislike for true love attachments on a mature heterosexual level, clearly expresses itself in a virtually complete degree of concordance as to overt male homosexuality in a sample of *one-egg* twins. It is indicated by this finding that two males who are very similar in both the genotypical and the phenotypical aspects of their personality development are much more likely than dizygotic twin brothers or ordinary siblings to be alike in those specific vulnerabilities which favor a trend toward fixation or regression to immature levels of sexuality. The infeasibility of the old theory (24), which associated a narcissistic preference for a homosexual object choice with a striking physical resemblance between homosexual partners, is demonstrated by a complete *lack of mutuality* in the sex histories of homosexual twin brothers.

If our concordance rates for *dizygotic* index pairs and Kinsey's homosexuality ratings for the total male population are statistically comparable, their rather close correspondence weakens the significance of some popular etiologic concepts of male homosexuality. Apart from militating against the probability of a *special genetic factor,* capable of turning the psychosexual integration of the adult male into an overt homosexual pattern, the observation of an only moderately increased concordance rate of overt homosexuality in genetically dissimilar twin brothers raised together plainly diminishes the plausability of explanations, which overstress the importance of such precipitating or perpetuating factors as social ostracism, incompetence of a particular parent, or other potentially traumatizing experiences arising from the effect of uncontrolled imperfections in the structure of modern human societies. Of course, the general conclusion that habitual predominance of a homosexual behavior pattern results from disturbing experiences only in a *limited* number of persons, by no means minimizes the psychodynamic significance of these constellational factors in potentially vulnerable individuals.

The *intersexuality* theory or, more precisely, a genetically oriented

"imbalance" theory is still based on statistically insufficient and cytologically unconfirmed evidence, but it has not been eliminated as a possible explanation for certain groups of male homosexuals. The principle of a disturbed balance between male and female genetic tendencies in these cases would not even be invalidated by the observation that some homosexual men have both a Y-chromosome and children who are boys. It is conceivable that phenotypically male homosexuals, who may be the product of an intersexual imbalance, are generally the ones distinguished by *infertility*.

Beyond question, the eventual exploration of the biologic components of male homosexuality will not be possible without the careful planning and a liberal financial support for more basic research, the execution of which has been shown by our experiences to be extremely difficult. It is also undeniable that the *urgency* of such additional work with respect to the genetic aspects of homosexual behavior is underscored by the ominous fact that adult homosexuality continues to be an inexhaustible source of unhappiness, discontent, and a distorted sense of human values.

Summary

1. In a consecutive series of 85 predominantly or exclusively homosexual male twin index cases, concordance as to the overt practice and quantitative rating of homosexual behavior after adolescence has been observed in all of the monozygotic index pairs (40). While many of the concordant twin partners claim to have developed their often very similar sexual pattern independently and far apart from each other, all of them deny any history of mutuality in overt sex relations. It does not seem justified, therefore, to explain a "narcissistic preference for a homosexual object choice" on the basis of a striking physical resemblance between homosexual partners.

2. Apparently, only two males who are similar in both the genotypical and the developmental aspects of sexual maturation and personality integration are also apt to be alike in those specific vulnerabilities favoring a trend toward fixation or regression to immature levels of sexuality. The most plausible explanation of this finding is that the axis, around which the organization of personality and sex function takes place, is so easily dislocated that the attainment of a maturational balance may be disarranged at different developmental stages and by a variety of disturbing mechanisms, the range of which may extend from an unbalanced effect of opposing sex genes to the equivalent of compulsive rigidity in a schizoid personality structure. From a genetic standpoint, this multiple causation of overt homosexual be-

havior in the adult male as an alternative minus variant in the integrative process of psychosexual maturation is comparable to that of left-handedness in a predominantly right-handed world.

3. In the dizygotic group of index pairs, over one half of the co-twins of distinctly homosexual subjects yield no evidence of overt homosexuality. According to whether the dizygotic concordance rates are related to homosexuality ratings 5-6 or 1-6, they vary from 11.5 per cent to 42.3 per cent and are only slightly in excess of Kinsey's ratings for the total male population. This finding weakens the significance of explanations which overstress such precipitating or perpetuating factors as social ostracism or parental incompetence in the etiology of adult homosexuality.

4. The total fertility quota of the index cases (11 marriages) consists of 3 boys and 2 girls. The sex ratio among the 187 siblings of the index cases (125:100) deviates from ordinary expectation, but the deviation fails to reach the level of statistical significance, underscoring the need for more extensive data with respect to a genetically oriented "imbalance" theory of male homosexuality.

BIBLIOGRAPHY

(1) Alexander, F.: *Fundamentals of Psychoanalysis.* New York: W. W. Norton, 1942.

(2) Bauer, J.: *Constitution and Disease.* New York: Grune & Stratton, 1942.

(3) Benedek, T.: *The Functions of the Sexual Apparatus and Their Disturbances.* Chapter 15 in Psychosomatic Medicine by F. Alexander. New York: W. W. Norton, 1950.

(4) Boss, M.: *Meaning and Content of Sexual Perversions.* New York: Grune & Stratton, 1949.

(5) Darke, R.: Heredity as an Etiological Factor in Homosexuality. JOURNAL NERVOUS & MENTAL DISEASE, *107:* 251, 1948; also Homosexual Activity. JOURNAL NERVOUS & MENTAL DISEASE, *108:* 217, 1948.

(6) Devereux, G.: Institutionalized Homosexuality of the Mohave Indians. *Human Biol., 9:* 489, 1937.

(7) Fenichel, O.: *The Psychoanalytic Theory of Neurosis.* New York: W. W. Norton, 1945.

(8) Gates, R. R.: *Human Genetics* (2 Vol.). New York: The Macmillan Company, 1946.

(9) Glass, S. F., Denel, H. F., and Wright, C. A.: Sex Hormone Studies in Male Homosexuality. *Endocrinology, 26:* 590, 1940.

(10) Goldschmidt, R.: *Physiological Genetics.* New York: McGraw-Hill, 1938.

(11) Henderson, G. D., and Gillespie, R. D.: *Textbook of Psychiatry for Students and Practitioners* (Sixth Edition). London: Oxford Univ. Press, 1946.

(12) Henry, G. W.: *Sex Variants.* New York: Paul B. Hoeber, 1948.

(13) Hirschfeld, M.: *Sexualpathologie.* Bonn: Marcus & Webers, 1916, 1921; also *Die Homosexualität des Mannes und des Weibes.* Berlin: L. Marcus, 1920; also *Sexual Pathology.* New York: Emerson, 1940.

(14) Hoch, P. H., and Zubin, J.: *Psychosexual Development in Health and Disease.* New York: Grune and Stratton, 1949.

(15) Jensch, K.: Zur Genealogie der Homosexualität. *Arch. Psychiat., Berl., 112:* 527,

1941; also Weiterer Beitrag zur Genealogie der Homosexualität. *Arch. Psychiat., Berl., 112:* 679, 1941.

(16) Kallmann, F. J., and Anastasio, M.: Twin Studies on the Psychopathology of Suicide. JOURNAL NERVOUS & MENTAL DISEASE., *105:* 40, 1947.

Kallmann, F. J., DePorte, J., DePorte, E. and Feingold, L.: Suicide in Twins and Only Children. *Am. J. Hum. Gen., 1:* 113, 1949.

(17) Kinsey, A. C., Pomeroy, W. B. and Martin, C. E.: *Sexual Behavior in the Human Male.* Philadelphia and London: W. B. Saunders Co., 1948.

(18) Koller, S.: Ueber die Anwendbarkeit und Verbesserung der Probandenmethode. Schlusswort zu den Bemerkungen von Th. Lang. *Ztschr. menschl. Vererb., 26:* 444, 1942.

(19) Krafft-Ebing, R.: *Psychopathia Sexualis.* Brooklyn: N. Y. Phys. and Surg. Book Co., 1922, and Stuttgart: F. Enke, 1924.

(20) Lang, T.: Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität. *Ztschr. ges. Neurol. Psychiat., 155:* 702, 1936; also Weiterer Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität. *Ztschr. ges. Neurol. Psychiat., 157:* 557, 1937; also Dritter Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität. *Ztschr. ges. Neurol. Psychiat., 162:* 627, 1938; also Vierter Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität. *Ztschr. ges. Neurol. Psychiat., 166:* 255, 1939; also Studies on the Genetic Determination of Homosexuality. JOURNAL NERVOUS & MENTAL DISEASE, *92:* 55, 1940; also Beitrag zur Frage nach dem Vorkommen einer totalen fötalen Geschlechtsumwandlung beim Menschen. *Arch. Julius Klaus Stift., 19:* 45, 1944; also Zur Frage nach der genetischen Struktur von Homosexuellen und deren Eltern. *Arch. Julius Klaus Stift., 20:* 51, 1945.

(21) London, L.S., and Caprio, F.S.: *Sexual Deviations.* Washington: Linacre Press, 1950.

(22) Mead, M.: *Male and Female.* New York: W. Morrow & Co., 1949.

(23) Sanders, J.: Homosexual Twillinge. *Genetica, 16:* 401, 1934; also Homosexual Twins. *Ned. teschr. geneesk., 78:* 3346, 1934.

(24) Schilder, P.: Ueber Identifizierung auf Grund der Analyse eines Falles von Homosexualität. *Ztschr. ges. Neurol. Psychiat., 59:* 217, 1920.

(25) Slater, E.: *The Genetical Aspects of Personality and Neurosis.* Congrès International de Psychiatrie, Vol. VI. Paris: Hermann & Cie., 1950.

(26) Spiro, C.: As quoted by Sanders, J. in Homosexual Twillinge. *Genetica 16:* 401, 1934.

(27) Stern, C.: *Principles of Human Genetics.* San Francisco: W. H. Freeman & Co., 1949.